Bothrodendron in Africa and Australia, and it is unfortunate that this material, like that from Bolivia, is not good enough for precise comparisons. It is, perhaps, significant that both the African (*Bothrodendron leslii* Seward) and Australian (*Cyclostigma australe* Feistmantel) forms have been compared with *Bothrodendron kiltorkense*. As far as comparisons are possible with the poor material that served as the type of *Cyclostigma australe*[7] the Bolivian material could be referred to the same species, but in view of the nature of the remains this resemblance may have no significance.

ZOOLOGY.—*A* Microfilaria *from the blood of a wild rabbit.*[1] BENJAMIN SCHWARTZ and JOSEPH E. ALICATA, Bureau of Animal Industry, U. S. Department of Agriculture.

Under date of April 2, 1931, Dr. C. M. Hamilton, of the Western Washington Experiment Station, Puyallup, Washington, forwarded to the Bureau of Animal Industry at Washington, D. C., two blood smears, with the following comments:

"A farmer in Arlington, Washington, found a rabbit in a stupor, and when it died later he mailed it to us for examination. There were four ticks, including one female specimen, on the back of the neck. Postmortem examination revealed nothing except a congested liver. However, in blood smears from the heart, parasites resembling nematodes were noted. Blood taken from the heart and diluted with distilled water showed these parasites to be alive."

On further inquiry, Dr. Hamilton advised the writers that the host in question was *Lepus washingtonii*.

A microscopic examination of the two blood smears, one of which had been stained with methylene blue and the other with Wright's stain, revealed the presence of microfilariae, in addition to blood cells. The former appeared to be sufficiently well stained to enable the writers to make out the morphological details commonly recognizable in well stained preparations containing microfilariae.

Although the specific identity of filarids cannot always be determined on the basis of their larval characters, it is not improbable that the microfilariae in question are the immature forms of *Dirofilaria scapiceps* (Leidy 1886), the only filarid known from North American rabbits. However, the final determination of the identity of these microfilarids

[7] O. Feistmantel, Palaeontographica, Suppl. 3, p. 70, pl. 1, fig. 6, 1878.

[1] Received May 8, 1931.

will have to be based on investigations of the further development of these larvae in suitable mosquito or other arthropod intermediate hosts, and on the subsequent transmission of the infective larvae to rabbits through the bites of the infected intermediate host. For the time being the larvae in question are assigned to the collective genus *Microfilaria* Cobbold, 1880.

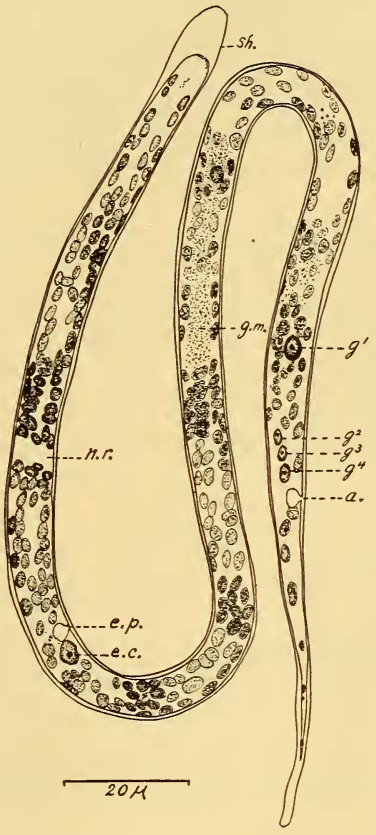

Figure 1.—*Microfilaria* species from *Lepus washingtonii*. *a*, anus; *e.c.*, excretory cell; *e.p.*, excretory pore; g^1, g^2, g^3, g^4, first, second, third, and fourth germ cells, respectively; *g.m.*, granular mass; *n.r.*, nerve ring; *sh.*, sheath.

Microfilaria species (?DIROFILARIA SCAPICEPS)

Figure 1

In common with many other microfilariae from the blood of mammals, each larva is enclosed and retracted in a sheath. The larvae are from 303μ to 340μ long and 8μ in maximum width. The morphological details are as figured. The anterior extremity is bluntly rounded; the body is of more or less uniform width up to a point somewhat anterior to the first germ cell,

where it begins to taper gradually and terminates in a long slender tail with a pointed tip. The stained specimens show numerous nuclei and a number of unstained areas. A small area immediately posterior to the head end is unstained. Another unstained area, which extends across the width of the body and is located at a distance of from 66 to 70μ from the anterior extremity, is the nerve ring. At a distance of from 22 to 29μ posterior to the nerve ring is the first so-called V-shaped spot which contains an opening to the outside; this is the excretory pore (*e. p.*). Immediately behind the excretory pore is the excretory cell (*e. c.*). At the point corresponding approximately to the middle of the body is the commencement of the so-called germinal mass (*g. m.*) which occupies an area about 40μ long and is characterized by the presence of minute granules; comparatively few nuclei are present in the field occupied by the granular mass. The nucleus of the first germ cell (g^1) is located at a distance of approximately 66μ from the posterior extremity; the remaining three germ cells (g^2, g^3, g^4) are smaller than and posterior to the

TABLE 1. DIMENSIONS AND PROPORTIONS OF MICROFILARIA SP. IN THE HEART BLOOD OF LEPUS WASHINGTONII AT ARLINGTON, WASH.

	No. 1	No. 2	No. 3	No. 4	No. 5
(1) Length (without sheath)	340	315	320	303	315
(2) Maximum width	8	8	8	8	8
(3) Distance from anterior extremity to nerve ring	70	66	66	70	70
(4) Distance from nerve ring to excretory pore	29	26	24	22	25
(5) Length of tail	44	42	47	37	40
(6) Percentage of body length anterior to nerve ring	20.5	20.9	20.6	23.1	22.2
(7) Percentage of body length anterior to excretory pore	29.1	29.2	28.1	30.3	30.1
(8) Difference between (7) and (6)	8.6	8.3	7.5	7.2	7.9
(9) Percentage of body length anterior to tail	87.1	86.7	85.4	87.8	87.4

first one, and are located in a row one behind the other. The second unstained V-shaped spot contains an opening to the outside; this is the anal opening (*a*). The tail is from 37 to 44μ long and contains very few stained elements.

Table 1 shows the principal measurements, in microns, of five larvae, and certain size relationships in percentages. The specimens (two slides) are U. S. National Museum No. 30,105.

Microfilariae are known from the blood of various rodents, such as rabbits, ground squirrels, porcupines, and rats. Some of the forms which are known from these hosts are listed in a paper by Hall (1916). The occurrence of microfilariae in rabbits in North America was mentioned by Harken (1927) in a note dealing with the fluctuation in numbers of rabbits in Canada. This author states: "Specimen consisting of hind leg of rabbit was infected with *Coenurus serialis* which

is an intermediate stage of a tapeworm, the other host of which is the dog tribe. The carcass was in poor condition for critical work but some microfilaria (microscopic worms) were found in the blood and some indication of the presence of protozoa." No further details concerning the microfilariae found in rabbits are given in Harken's brief report.

A species of microfilaria from a rabbit in Algeria, probably *Lepus sefranus*, specifically distinct from the worm discussed in this paper, was described by Foley, Catanei and Vialatte (1926), and regarded by these writers as probably identical with a microfilaria described by Balfour (1911) from a rabbit, probably *Lepus hawkeri*, from the Anglo-Egyptian Soudan, and also apparently identical with the larvae of *Filaria numidica* Seurat, 1917, from the abdominal cavity of *Lepus pallidor* and *L. kabylicus* of Algeria.

Considering the medical importance of filariasis and the need for further investigations on the therapeusis and other aspects of this disease, the occurrence of microfilariae in rabbits in North America, definitely established by the data presented in this paper, opens up the possibility of transmitting filariasis to domestic rabbits experimentally. In the event that this can be accomplished, it will facilitate investigations on the treatment and on various phases of the biology of filarial infections.

REFERENCES

ANDREW BALFOUR. *Veterinary notes.* Fourth Report of Wellcome Tropical Research Laboratories, A, 343–352. 1911.

H. FOLEY, A. CATANEI, and CH. VIALATTE. *Microfilaires du sang de quelques animaux d'Algérie.* Arch. de l'Inst. Pasteur d'Algérie **4**: 485–518. 1926.

M. C. HALL. *Nematode parasites of mammals of the orders Rodentia, Lagomorpha, and Hyracoidea.* Proc. U. S. Nat. Mus. **50**: 1–208. 1916.

J. B. HARKEN. *The fluctuation in the abundance of rabbits.* Canadian Field Naturalist **41**: 113. 1927.

L. G. SEURAT. *Une nouvelle filaire péritoneale des rongeurs.* Compt.-Rend. des Séances de la Soc. de Biol. **80**: 350–357. 1917.

ENTOMOLOGY.—*Three new Braconidae parasitic on bark beetles.*[1] R. A. CUSHMAN, Bureau of Entomology. (Communicated by HAROLD MORRISON.)

The three new species described below have all been reared in connection with studies of certain bark beetles, carried on by agents of the Bureau of Entomology. Of particular interest is the *Meteorus*, since most of the species of this genus are parasitic on lepidopterous larvae.

[1] Received May 19, 1931.